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EXAMINER

WOZNIAK, JAMES S

ART UNIT PAPER NUMBER

2655

DATE MAILED: 09/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/940,904

Applicant(s)

GAO, YANG

Examiner

James S. Wozniak

Art Unit

2655

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 16-27, and 34-41 is/are rejected.
- 7) ☒ Claim(s) 10-15 and 28-33 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 8/27/2001 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claims are objected to because of the following informalities:
 - With respect to Claim 2, "pitched-enhanced signal" on line 2 should be corrected to read --pitch-enhanced signal--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claims 5, 22, and 23** rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 5 recites the limitation "the signal" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claims 22 and 23 recite the limitation "the pitch-enhanced signal" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. **Claims 1-6, 16-24, and 34-41** are rejected under 35 U.S.C. 102(b) as being anticipated by Swaminathan et al (*U.S. Patent: 5,596,676*).

With respect to **Claims 1 and 19**, Swaminathan discloses:

Calculating a pitch enhancement coefficient (*fixed codebook gain index, which would require an inherent calculation step, Col. 21, Line 18- Col. 22, Line 3*);

Providing a fixed subcodebook comprising at least two fixed subcodebooks (*fixed codebook having two parts, Col. 15, Lines 15-28*);

Selecting a fixed subcodebook from among the at least two fixed subcodebooks (*fixed codebook index, Col. 15, Lines 48-58, and selecting a codebook based on the fixed codebook index at a decoder, Col. 21, Lines 18-48*); and

Applying a pitch enhancement in response to the pitch enhancement coefficient and the selected fixed subcodebook, wherein the pitch enhancement coefficient is dependent on the selected fixed subcodebook (*scaling a fixed codebook vector by a gain factor that is selected based on the gain index for a particular subframe, Col. 21, Lines 18-48*).

With respect to **Claims 2 and 20**, Swaminathan discloses:

Applying a pitch enhancement further comprises calculating a pitched-enhanced signal from a codevector selected from the selected fixed subcodebook, a pitch lag, and the pitch enhancement coefficient (*codevector from a fixed codebook, pitch delay from an adaptive codebook, and fixed codebook gain, Col. 21, Lines 18-48*).

With respect to **Claims 3 and 21**, Swaminathan recites:

Calculating the pitch enhancement coefficient based on a pitch gain (*Col. 21, Lines 18-48*).

With respect to **Claims 4 and 22**, Swaminathan recites:

The pitch-enhanced signal is calculated during a search through the subcodebooks (*obtaining a codebook vector, which is scaled by a fixed codebook gain, through a search based on an index, Col. 21, Lines 18-48*).

With respect to **Claims 5 and 23**, Swaminathan discloses:

The pitch-enhanced signal is calculated during an iterative search through the subcodebooks (*obtaining a codebook vector, which is scaled by a fixed codebook gain, through a search based on an index for multiple subframes, Col. 21, Lines 18-48*).

With respect to **Claims 6 and 24**, Swaminathan discloses:

The pitch enhancement coefficient is a mathematical factor from 0.0 to 1.0 (*zero gain, Col. 19, Lines 64- Col. 20, Line 4*).

With respect to **Claims 16 and 34**, Swaminathan discloses:

For a frame classified as type 0, where the steps of selecting a fixed subcodebook and calculating a signal are accomplished by using at least one factor selected from the group consisting of a pitch correlation, a residual sharpness, a noise-to-signal ratio, and a pitch lag (*subframe-based processing and autocorrelation lags, Col. 21, Lines 18-48*).

With respect to **Claims 17 and 35**, Swaminathan recites:

The speech compression system is a selectable mode vocoder (SMV) system
(*multi-mode speech encoder, Col. 3, Line 59- Col. 4, Line 4*).

With respect to **Claims 18 and 36**, Swaminathan discloses:

The method is applied to a code-excited linear prediction (CELP) system
(*Abstract*).

With respect to **Claim 37**, Swaminathan discloses:

The device is selected from the group consisting of a telephone, a mobile
telephone, a cellular telephone, and a portable radio transceiver (*telephone, Col. 3, Lines
19-30*).

With respect to **Claim 38**, Swaminathan recites:

At least one of an encoder and a decoder are provided on a digital signal
processor (DSP) chip (*signal processor, Col. 3, Lines 41-58*).

With respect to **Claim 39**, Swaminathan shows:

Communications medium interface operatively connected to provide a bitstream
from the encoder to a communications medium (*Fig. 1, Element 17*).

With respect to **Claim 40**, Swaminathan shows:

A signal transformation device to provide speech to the encoder (*Fig. 1, Element
11*).

With respect to **Claim 41**, Swaminathan shows:

The communications medium is one of a radio frequency, a microwave
transmission, and an optical transmission (*RF communications medium, Fig. 1, Elements
16 and 17*).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claims 7-9 and 25-27** are rejected under 35 U.S.C. 103(a) as being unpatentable over Swaminathan et al in view of Yeldener et al (*U.S. Patent: 5,774,837*).

With respect to **Claims 7 and 25**, Swaminathan teaches the speech decoder utilizing a codebook containing multiple subcodebooks, as applied to Claim 1. Swaminathan does not specifically suggest applying a pitch enhancement factor forward and backward, however, such a forward/backward pitch adaptation is well known in the art as is evidenced by Yeldener:

The pitch enhancement is applied both forward and backward (*adjusting pitch forward and backward using pitch tracking to improve the perceptual quality of output speech, Col. 12, Lines 26-50*).

Swaminathan and Yeldener are analogous art because they are from a similar field of endeavor in speech coding. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to combine the method of forward and backward pitch adjustment taught by Yeldener with the speech decoder utilizing a codebook containing multiple subcodebooks taught by Swaminathan to provide pitch continuity between speech frames using forward and backward pitch adjustment, thus obtaining higher quality output speech. Therefore, it would have been obvious to combine

Yeldener with Swaminathan for the benefit of obtaining pitch continuity between speech frames using forward and backward pitch adjustment.

With respect to **Claims 8 and 26**, Swaminathan further discloses look-ahead and look-back pitch tracking (Col. 6, Lines 16-41), while Yeldener additionally recites the combined forward and backward pitch adjustment as applied to Claims 7 and 25.

With respect to **Claims 9 and 27**, Swaminathan additionally discloses:

Pitch enhancement coefficient is applied to a first power (*fixed codebook gain, which is applied once, Col. 21, Lines 18-48*).

Allowable Subject Matter

8. **Claims 10-15 and 28-33** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

- With respect to **Claims 10 and 28**, the prior art of record fails to teach or specifically suggest a pitch enhancement (gain) coefficient applied to a first power for pulses that are one pitch lag from a main pulse and applied to a second power or squared for pulses that are two pitch lags from a main pulse in combination with a multi-rate speech coding system and method having a fixed codebook divided into multiple subcodebooks with

varying pulse formats. Also in combination with the previously noted features, the aforementioned speech coding system and method utilizes a pitch enhancement coefficient that is selected in response to a chosen subcodebook and applied both forward and backward in order to improve the perceptual quality of speech.

In addition to the prior art utilized in the above rejections, Taumi et al (U.S. Patent: 5,787,389), teaches a method for applying gain weights based upon a frame delay, however Taumi does not teach nor fairly suggest a pitch gain applied to a first power for pulses that are one pitch lag from a main pulse and applied to a second power or squared for pulses that are two pitch lags from a main pulse.

Thus, Claims 10 and 28 contain allowable subject matter.

- Since **Claims 11-15 and 29-33** further limit their objected parent claims, these claims also contain allowable subject matter.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- Swaminathan (*U.S. Patents: 5,495,555 and 5,751,903*)- discloses a speech coder featuring a fixed codebook divided into multiple portions.
- Aoyagi et al (*U.S. Patent: 5,752,223*)- teaches a speech compression system utilizing a codebook selector.

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- McDonough et al (*U.S. Patent: 5,926,786*)- teaches a speech coding system that computes pitch lag and a corresponding pitch gain during a pitch search for previous speech subframes.
- Oshikiri et al (*U.S. Patent: 5,878,387*)- discloses a speech coding system that implements pitch enhancement using a pitch gain.
- Das (*U.S. Patent: 6,148,283*)- discloses a codebook divided into subcodebooks in a speech coder.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Wozniak whose telephone number is (703) 305-8669 and email is James.Wozniak@uspto.gov. The examiner can normally be reached on Mondays-Fridays, 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doris To can be reached at (703) 305-4827. The fax/phone number for the Technology Center 2600 where this application is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the technology center receptionist whose telephone number is (703) 306-0377.

James S. Wozniak
9/2/2004


SUSAN MCFADDEN
PRIMARY EXAMINER